accepted by all codes of zoological nomenclature.

In a preliminary introduction to the Fauna japonica entitled 'Coup d'œil sur la faune des îles de la Sonde et de l'empire du Japon,' published in 1837, and issued in the fourth fascicule of the work, which also contained the Japanese snakes, Temminck briefly diagnosed the Japanese deer, on p. xxii, as a new species under the name of *Cervus nippon*. In 1844, seven years later, in the second decade of the mammals of the same work, a plate illustrating this deer was published as *Cervus sika*. The text describing it more in detail under the latter name did not appear until many years later, probably not until 1852 or 1853. The diagnostic features given are essentially the same as indicated in the preliminary discourse of 1837.

The Japanese deer must, therefore, in the future stand as *Cervus nippon* Temminck.

LEONHARD STEJNEGER.
U. S. NATIONAL MUSEUM,
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THE POSSIBILITY OF ABSORPTION BY HUMAN BEINGS OF NITROGEN FROM THE ATMOSPHERE.

THE physiological value of nitrogen is to provide the staging or framework for the support and functional efficiency of the construction and nutritive processes at work in the living animal organism. The absorption of nitrogen by the animal organism has lately been regarded as resulting from the intermediary action of the vegetable world—a mode of nature-economy which there would be no reason for limiting to compounds of nitrogen, but should be extended to the entire range of animal-mineral absorption.

From this point of view, which seems to be based on close scientific observation, there has lately been extended a good deal of apparently well-qualified criticism with regard to the efficacy of the animal body-tissue to absorb and assimilate drugs derived from the mineral kingdom. Thus the administering of iron, strychnine, arsenic and other mineral tonics has been vigorously and justly condemned, not only by lay students, but also by the more advanced students in the medical profession themselves.

Yet, in the light of still more recent researches, it has been ascertained that the true reason for condemning certain drug medication does not lie in the assumed failure of the mineral compound to yield to absorption, but rather in the fact that such absorption is really possible. For, while the power of the mineral to generate changes in the animal organism largely proceeds on a mechanical basis, the fact remains that the changes wrought, let us say, by arsenic in the hemoglobin of the blood can be rationally explained only by admitting an action due to processes of physiological chemistry.

To discover the character of the forces and conditions at work in these processes of absorption has recently been the aim of some eminent French and German scientists. Thus, in his extensive studies of the character and genesis of nitrifying bacteria, Dr. Wohltman, of the Agricultural Institute in Bonn-Popelsdorff, Germany, has brought to light some highly interesting points with regard to the relations existing between nitrogenous compounds and organic substances. Among other observations he has found that the action of certain bacteria, hitherto considered indispensable in the elaboration of the nitrogen molecule for its absorption by the vegetable, is so only under certain conditions. In his 300 experiments with the soil in the valley of the Rhine, Dr. Wohltman ascertained that wherever the soil is rich in nitrogenous fertilizers, preferably ammonium nitrate, the leguminous plants are found to grow and absorb nitrogen without the presence of bacteria. From this fact Dr. Wohltman draws the conclusion that the 'association of the plants with the bacteria is not a necessity, but an expedient, and whenever there is a rich supply of nitrogenous elements in the soil, they (the plants) dispense with the bacteria and with the free nitrogen, which the latter make available, by directly secreting it from the chemical combination of soil or air in which it is held suspended.'

From this fact, it would certainly be justifiable to draw the inference, that whatever

under given conditions is available to the vegetable organism, may also, under corresponding conditions, be within the power of the animal organism. And as the intermediary action of the bacteria has its basis in 'expediency' rather than in necessity, it follows that nature can dispense with any process, when ends of higher evolutionary order are aimed at. Hence, she recognizes no immutably fixed ways of procedure, but manifests everywhere along the lines of least resistance, using methods which, for the time being, conform closest to the most advantageous conditions. Nor are there to be found any organically or physiologically interposed impassable barriers between the various kingdoms of nature. Therefore, if the animal kingdom is evolved from the vegetable, there can be no power of function or assimilation in the latter, which is not also present—though perhaps latent—in the former. The larger must necessarily in itself contain the lesser, as a function or equality, once evolved, is forever retained in the subsequent output of a similar evolution; while at the same time continually increasing in strength and complexity. Hence, whenever 'expediency' demands the functioning in an entity of a certain power, the latter will make its appearance on the field of evolution though conditioned by natural environments.

Through his painstaking experiments, Dr. Wohltman has shown that in the absence of the specific bacteria, the plant organism has proceeded to exercise unsuspected functional powers. That similar powers, under corresponding conditions, may be called into action in the animal organism, can not reasonably be doubted, and the absence of 'free nitrogen' in the animal system, *i. e.*, the reduction of nitrogenous tissue caused by a longer or shorter abstinence from food, may probably bring about such conditions. Of course, on the other hand, the circumstance must not be lost sight of that, even if the proper conditions have been present, the evolution of the great majority of individuals may not yet have reached a stage of development where the inherent powers of their nature are adequate to an immediate response to the call. Hence, the utilization of this great physiological fact must be preceded by a self-conscious recognition and appreciation of the evolutionary possibility of the process. That in course of physical and mental unfoldment, the individual shall be able to absorb his nitrogenous needs directly from the atmospheric air, we have, in view of the above facts, no true reason for doubting.

In the journey through natural evolution we are met by neither air-tight nor life-tight compartments. To their origin and essence all forms are identical; and a rising French scientist, Dr. Barière of Lyons, has arrived at the position that this identity of the entities of evolution extends not only to the character of origin, but also to the place of origin. According to him, the cradle in which life found its first receptacle was rocked by the waves of the ocean, or, in the words of the old account of Genesis which the doctor quotes—not in support of, but as a case of curious coincidence with, his theory: "The spirit of God moved upon the face of the waters." "It" (the primitive life), Dr. Barière continues, "sprang from the single cell, which constitutes practically the same manifestation of forces to-day as in a hypothetical dawn of existence. And in the bodies of all plants and animals the cells are continually bathed in a fluid, which, whether lymph, blood, or vegetable sap, differs in no essential way in its composition from sea water."

But more than this, the crystal itself has yielded up its secret to the scrutinous search of science, and confessed to a possession of the same powers of absorption as found in the kingdoms above it. At the special stage in the formation of crystals when they are found to collect themselves from their saline solutions into concrete substance, they seem to behave like sentient beings, governed in their movements by orderly purposes. In this intermediate stage between solution and crystalline fixity they exhibit all the characteristics of complete cell life, with cell-wall, nucleus, nucleoli and granulated cell body, while all throughout the transformation they show a very marked self-adjusting activity.

This fact would make it appear very prob-

able that the genesis of the single cell, whether passing into crystalline fixity or organizing into higher forms of life, points to the same place of origin—the salt sea—where the microscopic entity at the very outset is surrounded by large quantities of organic nitrates. Hence, the power of absorbing nitrogen would constitute the first and mutual condition for any order of cellular existence, organic or crystalline. And, as the evolution of the organic structure proceeds through and by the inorganic, it follows that the native powers of the mineral cell—of which nitrogenous absorption constitutes one—are all transmitted to the subsequent cell structures of vegetable and animal life.

On the basis of the experiments and investigations referred to in this article, there seems to be nothing either unreasonable or unscientific in the theory that the human being, under certain conditions, possesses the power of assimilating nitrogenous compounds in his vital economy without the assistance of an intervening vegetable kingdom.

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QUOTATIONS.

MR. J. B. BURKE'S EXPERIMENTS.

MR. BURKE made use of solid radium bromide in fine powder. He sprinkled a few minute grains on a gelatine broth medium, possibly somewhat soft, so that the granules would sink slowly below the surface. Once there they would dissolve in and decompose the water, liberating oxygen and hydrogen, together with emanations, which would remain mixed with these gases. The gases would form minute bubbles, probably of microscopic dimensions, and the coagulating action of the emanation on the albumen of the liquor would surround each with a skin, so that the product would appear like a cell; its contents, however, would be gas, or, rather, a mixture of the gases oxygen and hydrogen. The emanation, enclosed in such a sack, would still decompose water, for enough would diffuse through the walls of the sack, which, moreover, would naturally be moist. The accumulation of more gas would almost certainly burst the walls of the cell, and almost equally certainly in one or two places. Through the cracks more gas would issue, carrying with it the emanation, and with it the property of coagulating the walls of a fresh cell. The result of the original bubble would resemble a yeast cell, and the second cell a bud, or perhaps more than one, if the original cell happened to burst. This process would necessarily be repeated as long as the radium continued to evolve emanation, which would be for the best part of a thousand years. The 'life,' therefore, would be a long one, and the 'budding' would impress itself on an observer as equally continuous with that of a living organism.

I am surprised to learn from Mr. Burke's first letter that the 'organisms' appear to dissolve in water. The emanation does not coagulate or apparently affect gelatine, for I have tried and found that it does not; indeed, it was not to be expected. Is it possible that the gelatine is pushed away to form the cell-wall, leaving the albumen as a partial content of the cell, along with gas? The latter would, doubtless, diffuse through the cell-wall of coagulated albumen and dissolve in and mix up with the water. On placing the apparent 'organism' in water the gelatine, too, would be extracted, and the cell would seem to disappear, the wall being excessively thin. It would be interesting to learn if Mr. Burke has attempted to stain his 'organisms' with the usual dyes used by microscopists. It is possible that the coagulated albumen would take the stain better than the uncoagulated matter and that the structure would thus be revealed.

As I said before, I have no desire to dogmatize. The supposition that the pouring of energy in some form into matter similar to that of which living organisms are made, and which serves as sufficient food for actual living organisms, might conceivably result in the production of life, is a very attractive one. But one is bound to sceptical, and the explanation which I have ventured to suggest appears to me to be sufficient to meet the case. But no one will rejoice more than I if it should ultimately prove to be inadequate.—Sir William Ramsay in *The Independent*.